RISK MANAGEMENT ON FINANCIAL DERIVATIVES

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MBA PROJECT REPORT

Presented to

The Graduate School

In Partial Fulfilment

of the Requirements for the Degree of

MASTER OF BUSINESS ADMINISTRATION

THREE-YEAR MBA PROGRAMME

THE CHINESE UNIVERSITY OF HONG KONG

May 1996

APPROVAL

Name : Yau Tak Kin, Thomas

Degree : Master of Business Administration

Title of Project : Risk Management on Financial Derivatives

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Date Approved: May 1, 96

ABSTRACT

The past year will probably be remembered by treasury managers as the year of derivatives. The problems relating to the use or misuse of derivatives have been widely publicized. Unfortunately, in the rush to assign blame for huge losses experienced by several companies, observers have taken aim at derivative instruments in general and failed to evaluate the real cause. The problem relating to derivatives were not created by the instruments themselves, but rather by the lack of a framework and internal controls to prevent inappropriate use of financing and derivative alternatives. In this project, we will take a more positive approach by understanding the operations of financial derivatives, discuss major issues involving derivatives and finally, identify any effective risk management technique or legislation that can be implemented.

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CHAPTER I

INTRODUCTION

Development of financial derivatives

Financial derivatives are getting more prevalent in the corporate finance arena - the notional value of outstanding derivatives grow from one trillion dollars in 1980 to an estimated sixteen trillion dollars in 1994. What make derivatives more interesting is not just its trading volume but also numerous incidents on mis-management which led to downfall of well know corporations, municipals and financial institutions: Procter & Gamble lost $ 157 million in interest rate swap, Orange county California lost $ 1.7 billion in structure notes and end up in bankrupcy and of course, Barings lost one billion dollars in Nikkei futures before it went bankrupt and was taken over by the Dutch group ING.

Those regrettable incidents, however, are *de facto* a consequence of the management conrols of institution dealing in derivatives rather than of the products themselves. Derivatives are risky. So management needs to put in place sufficiently resilient risk management systems to ensure, so far as is humanly possible, that catastrophic losses do not occur.

Characteristic of financial derivatives

Derivatives are financial instruments which values are *derived* from some underlying commodities or securities. The underlying commodities/securities can be anything from stock, bonds, currency, gold to strange things like orange juice and pork belly.

The most popular type of derivatives actively traded in the market includes option, future, swaps and other more sophisticated ones like swaptions, caps and collars. There are also derivative contracts that are traded over-the-counters, they are mostly issued by merchant banks for their own clients to manage their risk, these contracts are usually hold to maturity or squared by another contract and seldom trade in secondary market.

Derivatives were first intorduced to the US in as early as the 18th century when commodities were traded in the form of futures contracts. With the expansion of world trade and finance, the markets for derivatives usage have grown rapidly, particularly in recent years. Derivatives arise from the need of people to modify their risk bearing: Financial investment is risky in nature, however, most investors are risk-averse who want to maintain their risk to manageable level. Financial derivatives fulfil that function by changing the risk return relationship of investors. Risk can be regarded as another commodity that people want to get rid of. The price to get rid of the risk is the premium they paid on portfolio insurance. By allocating risk to the lowest bider (the party most able to bear), overall cost is minimized. Thus, derivative ensure efficient allocation of resources with greater certainty.

CHAPTER II

RISK ENCOUNTERED BY BUSINESS AND ITS MANAGEMENT

Risk encountered by business

Doing business is inherently risky, manay grades of risk can be encountered. Amongh them are:

1. exchange rate risk
2. interest rate risk
3. coummodity price risk
4. equity price risk
5. market risk
6. credit risk
7. operational risk
8. legal risk
9. liquidity risk

The first four are directly price-sensitivie. A business may be at a disadvantage if any of these prices turn down. Market risk areise when market factors cause a change in the price of goods or services. Credit risk occurs, quite simply, if a customer fails to meet his or her

financial obligations for the supply of goods or services. Operational risk could involve, for example, the malfunctioning of a crucial piece of production tehnology, a downturn in systems, a failure in distribution channels or a strike by employees. Legal risk is the risk that an acitvity by a compnay may lead to legal action against it. Liquidity risk areises where mismatches in cash inflows and outflows leave insufficient cash to meet current obligations.

Applications of derivatives in risk management

Broadly speaking, derivatives can be used for both hedging, speculating and arbitraging.

Hedging using derivatives

Derivatives emerged as a safeguard to investor by allowing portfolio insurance. By paying a premium, investors can turn unexpected future events into certainty. Investors with open position with respect to a particular security can hedge its exposure by entering into an opposite transaction with derivatives.

Arbitrage using derivatives

Investment bankers who were familiarize with the nature of derivatives, tailor-make specific portfolio for their clients. The technique they employed is called "replicating portfolio", by bundling derivatives with underlying securities, a new instrument is created which share the same risk-return relationship with another securities. Since their risk-return characteristic is the same, they should demand the same price. Any disparity represent arbitrage opportunity;

by buying one portfolio and going short on the other, investors can earn riskless profit. Since there are numerous derivatives trading in the market, countless portfolio can be constructed using this technique, computer is heavily used to perform that function. The on-going activity ensure price parity between different class of securities.

With derivatives, corporations can hedge against the four price-sensitive risk listed above. Specifically, derivatives can be used in the following ways:

1. To achieve lower funding costs through arbitrage or customized instruments - these exploit differences between markets. Where financial market are segmented nationally or internationally, derivatives deliver indisputable cost savings for borrowers and higher yields for investors.

2. Diversifying funding sources - companies can obtain finance from one market; they then swap all or part of the cash flows into desired currency denominations and rate indices. Placing debt with new investors may increase liquidity and reduce funding costs for the issuer.

3. Funding operations in multiple countries at lowest cost - multinationals may fund that local borrowing is too small to raise in national market It ma be more cost effective to borrow more than they need in such market and swap excess debt into other needed currencies.

4. Hedging the cost of future fixed-rate-debt - companies may be concerned about volatile interest rates when considering the future cost of fixed-rate-debt. Delayed-start swaps or

forward swaps could fix the interest rate at the time of the funding decision.

5. Hedging the cost of future floating-rate-debt - risk here could be limited by using a cap or a swap.

6. Derivatives can be used to hedge against market risks, managing existing debt or asset portfolios; interest rate swaps can be used to adjust the ratio of fixed-to floating-rate debt. Currency swaps can transform an obligation in one currency to an obligation in another to change the mix of the currency portfolio.

CHAPTER III

SELECTED DERIVATIVE CASES

Proctor and Gamble

Over the years, P&G had done many kinds of business with Bankers Trust and that throughout the banking world had a reeputation for aggressively managing its interest costs. In the early 1990's, for example, P&G swapped good-size quantities of its fixed-rate debt into floating-rate debt, thereby successfully betting on a drop in rates. In October 1993, still expecting rates to fall, P&G talked to Bankers Trust about ways of replacing a fixed-to-floating swap that was maturing. P&G's specific objective was to negotiate a new $100 million swap that would (a) again put it in the position of paying floating rates and (b) squeeze these to a minimum. Specifically, the company wanted to pay its standard, upper-crust commercial paper rate (then about 3.25% for six-month paper) minus 40 basis points.

In the way of big dealers and especially itself, Bankers was prepared to tailor-make a contract to fit the client's wishes and then to cover its own flanks by hedging the risk it had just taken on. In interest rates, however, as in life, there is no free lunch. If P&G were to do this deal, it would be erquired to take on extra risk, which would come in the form of reduced returns if interest rates did the unthinkable and went up. Keep talking, said P&G. Bankers then proposed seversal different deals, one after another, and to each P&G said no. This ping-

pong had the feel of a never-give-up stock salesman saying. Finally, a deal was struck. In early November, suddenly raising their sights to $200 million rather than half that, the two parties signed up for a five-year swap whose lverrage sprang from an option include within it. For the first six months of the deal, P&G was to pay a floating rate not just 40 basis points, but 75 below commercial paper rates. For the 4½ years after that, the floating rate was to be dictated by a brain-twisting formula whose components would include five-year and 30-year Treasury rates as of May 4, 1994, which was the six-month anniversary of the deal. Under the best case for P&G, the floating rate would continue at 75 basis points below commercial paper for the full term of the swap. Under the worst case - well, that's what the lawsuit is about.

For all the deal's complexity, the gist of it can be stated quite simply: The swap had a "notional", or principal value of $200 million. Assume that P&G scored to the maximum, saving 75 basis points for five years. On the $200 million, that would be $1.5 million a year, for a total of 7.5 million. The annual savings would have cut P&G's interest bill, which runs around $500 million, by 0.3 of 1%.

And what risk did P&G accept in return? For this lure of $1.5 million annually - think of that as kind of an insurance premium payable to P&G - the company agreed in effect for the next six months to act as an insurer covering the risk of interest rate eqrthquakes. With remarkable fury, these quakes then occurred: Five-year Treasury rates rose from 5% in early November 1993 to 6.7% on May 4, 1994, a dramatic increase. P&G's other benchmark, 30-year Treasury rates, went from about 6% to 7.3%.

At an early point in this action-packed period, P&G went so far as to increase the money it had on the table. On February 14, 1994, just ten days after the Fed tightened rates, the

company netered into another highly leveraged swap geared again to the idea that rates would not soar. This swap had a princopal value of about $93 million, a term of 4¾ years, and was a wedding band denominated in deutsche marks. The swap bestowed a very favourable floating interest rate on P&G for the first year of the swap and, over its full term, offered the promise of about $949,000 in total savings if everything went right with a certain German "swap rate." These savings would result if the rate, then 5.35%, did not fall below 4.05% or rise above 6.10% at any point before April 14, 1995. On the other hand, if the rate popped ou of that band, even for a day, another crazy-quilt formula took over. Under this formula, the level of the swap rate on the precise day of April 14, 1995, and its relationship to 4.50% would determine what interest rate P&G paid for the last 3¾ years of the swap.

The danger, then, for P&G occured, first, if the swap rate jumped out of the prescribed band and, second, if the swap rate was above the 4.50% benchmark rate on April 14, 1995. In that event, P&G was to begin pating interest that included its base rate for the first year plus a :spread," And this spread was ten times the difference between 4.50% and the swap rate. So once again P&G had sold earthquake insurance. As it happened, the magic date of April 14, 1995, never precisely came into play. Just 16 days after the contract went into effect, the swap rate flew out of the band on the up-side. From all apperances, P&G then stareted to realize just how catastrophic things could get with its swaps if rates kept going up. It promptly began trying to mitigate the danger by negotiating a "lock-in interest rate" for each of tis swaps. In other words, it wanted to firmly set the rates that it would pay for the duration of the swaps, rather than leave itself at the mercy of interest rate movements. In the end, dismaying loss figures or not, P&G was forced to accept the deals that Bankers Trust offered. By April 11, P&G had locked in rates on both swaps and confronted the horror of insuring quakes: For the duration of the first swap, which runs to late 1998, the company agreed to pay interest rates that are 1,412 basis point above the commercial paper ratre. And as long as

the wedding band binds P&G must pay rates 1,640 basis point the base rate specified by the swap.

Orange County

The locus of all this trouble was the Orange County Investment Pool, into which the county and its cities, school districts, and special districts deposited their tax receipts. This fund owned almost no derivative contracts but had buckets of derivative securities. Most of these were "structured notes," a name arising from the fact that the issuers of these notes, among them such parties as the Federal Home Loan Banks (FHLB), structure their terms to fit the investment wishes and opinions of particular institutional buyers. If he chooses, a buyer with strong convictions about the market may sign up for a package that combines the lure of above-market returns with extra risk. In other words, he rakes in money if he's right about the market but loses his shirt if he's wrong.

For example, the Orange County pool held large quantities of "inverse floaters," a kind of structured note whole value is often linked to the London Interbank Offered Rate, familiarly known as Libor. If Libor goes down, the rates on the floaters do the inverse, going up. That means the noteholders earn handsome, above-market rates. But if Libor goes up, rates on the notes head for the cellar. Simultaneously, the market value of the notes declines, since they are carrying rates below those generally available in the market.

Throughout the early 1990s, the manager of the Orange County pool, county treasurer Robert L., Citron, had a view - totally accurate - that interest rates were going down and that bonds were therefore going up. The yields earned by the Orange County pool from 1991 to 1993

were a marvel, running above 8.5% during a period when bond mutual funds were averaging about 7%. Mightily impressed, Orange County's municipalities shoved their deposits from around $3 billion in 1991 to $7.6 billion in 1994.

Alongside, all the way, stood Merrill Lynch, who recognized Citron as a very valuable asset. Merrill Lynch helped educate Citron about the derivatives market and sold him derivatives securities. It lent his fund money. And it made itself a leader in underwriting and distribution the securities offerings of various Orange County municipalities. Altogether, Merrill and Stamenson got a lot of juice out of Citron and friends.

But as early as October 1992, Merrill began talking to Citron about the volatility that he had built into his portfolio and suggesting he reduce it. Citron would have none of that plan, nor did he listen to other Merrill cautionary statements that came along later.

Instead, wanting to back his continuing and now wrongheaded conviction that interest rates were still heading down, he piled on borrowings. In 1994 his core stake was the $7.6 billion that investors had deposited in the Orange County pool. To that he had added about $12.5 billion in debt, collaterized by securities held in the fund's portfolio. Roughly $8 billion of the $20 billion total was in structured notes. So there was a derivative problem here, yes. But leverage is what really did in Citron and his county.

The danger gathered force on February 4, 1994, when the Fed first tightened interest rates and sent fixed-income securities, including all those that Citron owned, into a grizzly bear market. By early December, the Fed had turned the screws five more times, and six-month Libor had gone from 3.6% to 6.8%. Wall Street's brokers, who had provided Citron with most of his loans, were demanding additional collateral that he couldn't supply. So some

brokers sold their collateral, others mobilized to do so, and Citron's whole jerrybuilt contraption tumbled.

Weeks later, after a team of financial medics had overseen the liquidation of the fund's portfolio, the toll could be calculated: Of the $7.6 billion that Orange County's municipalities had put up, a stunning $1.7 billion had been lost. The ramifications for these investors are large: They are now struggling with their budgets, cutting back services, and fighting among themselves as to how the losses should be divided. And Orange County, of course, has filed for bankruptcy.

Meanwhile, Orange County has sued Merrill Lynch, charging that it "encouraged" Citron to invest in securities that, by the laws of California, were beyond the bounds of permissible risk. Merrill says it did nothing improper and denies being able to tell Citron anything

Barings Bank plc

The derivative instrument at the centre of the Barings' affair is the Nikkei 225 futures contract. Like the thousands taken out with Barings money, it was launched at Simex in 1986. Japanese investors regarded it not without trepidation for the risks futures contracts carry. But, with Simex gaining a headstart, Osaka began trading the 225 futures two years later. The two exchanges have since lived and let live, not least because the tow markets are useful for arbitrage. Simex though, has been the more aggressive of the two: it has lower margin requirement. As is now widely known, arbitrage of the Nikkei 225 futures had become a "bread-and-butter" business of both Barings Futures in Singapore and Barings in Tokyo. At its simplest, Barings bought and sold at Osaka and Simex, taking advantage of the

minute differences in price at the two exchanges. It is a relatively simple and risk-free trade to execute.

The way it worked at Barings was for Tokyo to take out opposite long (buy) and short (sell)positions, respectively, at Osaka and Simex. The Singapore contracts were coursed through Barings Singapore, which acted as the broker. With every 3,000 futures contracts it had bought in Osaka, for example, it would have short position for 6,000 contract in Simex (since the contracts at Simex are half the size of Osaka's).

Arbitrage opportunities between the two markets are available, but not always for long because other players come in, thereby narrowing the spreads. Today the spread may be no more than a tick or five points on Simex or ten points on Osaka. Netting off transaction costs the profit can be minuscule. Normally, banks try to job (onsell) the contracts during trading day, but on some occasions the positions are held for several weeks or until expiry. This is termed lagging, where positions are left open in anticipation of a favourable price movement. If positions remain open up to the expiry date, an auto-settlement procedure will close out trades in both exchanges. Arbitrage is not inherently risky since the long and short position are matched. a bank with significant arbitrage positions would have no more than a few thousand contracts in the order of US$ 10 million to US$ 30 million. Towards the end, Nick Leeson was running tens of thousands of contracts worth a few hundred million dollars. By increasing the size of the trades he must have been hoping to increase his profits.

But it is now clear that Leeson was not engaged in arbitraging alone. He was also taking positions in support of a market view. His market view was that the Nikkei would strengthen. His bet was that the US dollar, which had by then fallen to 101, would strengthen. With Japanese interest rates at an all time low, he believed the exodus of funds out of Japan would

accelerate and weaken the Japanese bond market. A weaker yen would benefit Japanese companies in the export and, in turn, improve corporate earnings. Investors would turn positive and push the Nikkei 225 up.

Indeed, suggestions that Leeson had an inside track on the imminent turnaround of the Japanese economy may have been based on bullish economic reports published by Goldman Sachs, Morgna Stanley and CSFB in the summer of 1994. The release of the reports coincide with a re-organization at Barings in London in which the bank decided to concentrate more on propriety trading, as suggested by its head of derivatives, Ron Baker.

A trader in one Japanese broking house recalls that starting October, two months after the re-organization. Baring's activity in the Nikkei 225 futures began to expand. Towards the end of the year, all the leading US investment banks changed their bullish view of the market. Leeson, apparently, did not.

There have been suggestions that Barings Singapore was also on the other side of the Simex ledger - that Leeson had been buying the contracts either on behalf of a client (real or fictitious) or for Barings Singapore's own account. Cross trading happens when two customers, one buying and the other selling (at the same price) deal through the same broker. Because Simex adopts an open outcry system, that deal cannot be closed outside the exchange; it must be routed into the pit. At the pit, the trader must shout three times both bid and offer prices. If there are no takers, the cross trade is completed between the two parties. International exchanges have strict rules that govern cross traders; often, traders must cross their arms, and in some markets trading session are videotaped to prevent a trader effectively trading with himself. Some say Leeson used the cross trade to build up his positions. That my be so, but not necessary all the time. One futures trader says a cross can only happen if a

buyer sees an advantage from a prevailing buoyant market, or have a strong view of the market direction.

Whether Barings Singapore was on the other side of the equation or not is less important than it taking a market view of its own. If Leeson had wanted to speculate in the market, taking the other side in cross trade was only one way of increasing his position. Buying Nikkei futures directly on Simex was another. Indeed, in November 1994 or earlier, Leeson was trading futures and selling options at Simex. One of the most talked about option strategies he used was the short straddle. This is a speculative maneuver that involves the simultaneous selling of calls and puts at the same strike price. A seller of a straddle takes the view that the market would trade within a range. For taking that view, they receive a premium for each call and each put. As long as the index stays within a range, they either break even or profits from the deal. However, if the market moves out of this range, the loss to the seller can be unlimited.

One pit trader recalled Leeson would come in with 20 or 50 straddle contracts; moments later he would have another 400 or 500 on offer. This did not happen every day, but perhaps once a week on average. While these volumes were large compared to those handled by local traders, but they was not out the ordinary for one of the large institutions such as Barings. When Barings went bust, much was made of the straddles and how they were the cause of Leeson's downfall. Leeson sold straddles, it has been suggested, to raise premium to finance his purchase of Nikkei futures.

But, because Leeson kept selling straddles, it is inconceivable that the premium could have been used to finance anything other than the margin for new straddles. On a cash flow basis, Leeson was no better off. The more straddles he sold, the more margin he had to put up and

the more cash he needed to meet them. So why did Leeson sell so many straddles if not to raise cash? The answer is much more mundane : to enhance his profits if his bet - that the Nikkei would rally - turned out to be correct. He had already built an inventory of long futures, which provided protection for one leg of his short straddle on the call side.

That was the scene as 1995 began. Leeson had been happily selling straddles and building his long positions. Margining by Barings Tokyo, using internal funding and loans from Japanese banks, with collateral from other forms of securities, was equally straightforward. On Osaka alone, at the beginning of January, Barings had 3.024 net outstanding long contracts, worth about ¥ 59 billion, the most of any broker on the Osaka exchange. At the same time, Leeson had been building an exposure on Simex. The entire trading strategy, says the Barings executive, was limited "only by fund availability". Such was the confidence in the market until the Kobe earthquake.

The Kobe quake struck in the early hours of the morning of January 17. That day, the yen weakened by around one yen against the US dollar to a rate of 99.26, while the Nikkei-225 stock market average fell 89.85 points to 19,241.32. But the Nikkei had been on a downward trend since the beginning of the year. The Nikkei continued to slip until the weekend, but on Monday, January 23, it slumped below 18,000. In such a bearish and uncertain market, traders were concerned about opening new positions. Indeed, on the Monday of January 23 the gross open position at Simex declined by more than 3,500 contracts. Traders were obviously closing out, as a stop-loss measure. And perhaps, Leeson and Barings Tokyo did as well. Yet, the next day, January 24, and particularly on January 25, gross open positions at Simex rose by 14,000 contracts. At Osaka, open interest rose by more than 8,600 on January 25 and 26.

By January 27, Barings Tokyo's long positions were reported to be 16,850 compared with about 7,000 a week earlier. Whether this followed the cue from Barings Singapore is not clear. Barings would have spent more than US$ 1.3 billion to cover margins at both market and on Tokyo;s exposures alone. Add Barings Singapore's long positions, and the margins rise to US$ 1.5 billion. The straddle would have suffered loses. On this basis, actual net losses alone would have amounted to a few hundred million, if the Nikkei had not dropped further. But the damage was there already.

By the end of January 27, Barings Tokyo's long position at Osaka expanded to 16,852 contracts. Barings Singapore's would have been double those figures in Simex equivalent contracts. The day after Leeson left Singapore on February 23, the volume stood at 15,928 long contracts for March 9 expiry on Osaka and 1,009 June settlement long position. But the Nikkei 225 had since dropped another 700 points to 17,500. When the March contracts had to be settled on the 10th, the Nikkei had lost more than 1,400 points since January 27, or 800 points since February 24. Thus between February 24 and March 10 settlement day, the losses had accumulated by another US$ 135 million to US$ 735 million. In the same hectic period, the US dollar/yen exchange rate had also fallen by 6% to ¥91.

The nine days in January had proved crucial. Without substantial change to its position, the index had fallen by 9.4% between January and March 10, but Baring's aggregate losses had doubled. Not counting the variation margin created by the fall of the Nikkei, the 16,850 long Osaka positions would have required margin of ¥101.1 billion (US$ 1.04 billion) at ¥ 6 million (US$ 61,860) a contract. Of this, a proportion had to be cash: the balance could be met by collateral like Japanese Government Bonds. With the Simex margins, this totaled US$ 1.3 billion. That was why Baring's head offer had to step in.

CHAPTER IV

CLASSIFICATION OF RISK

Using derivatives to hedge against business, however, exposed the business to other types of risks - it simply substitute one type of risk with another. The major types of risk encountered by derivatives are listed below, they are by no means exhaustive and they also apply to other financial instruments as well:

Credit risk

Broadly defined, credit risk is the risk that a counterparty will fail to perform on an obligation to the institution. The institution should evaluate both settlement and pre-settlement risk at the customer level across all products. On settlement day, the exposure to counterparty default may equal the full value of any cash flow or securities the institution is to receive. Prior to settlement, credit risk is measured as the sum of the replacement cost of the position, plus an estimate of the institution's potential future exposure from the instrument as a result of market changes. Replacement cost should be determined using current market prices or generally accepted approaches for estimating the present value of future payments required under each contract, given current market conditions.

Market risk

Market risk is the risk to an institution's financial condition resulting from adverse movements in the level or volatility of market prices. The market risks created - or hedged - by a future or swap are familiar, although not necessarily straightforward to manage. They are exposures to changes in the price of the underlying cash instrument and to changes in interest rates. By contrast, the value of an option is also affected by other factors, including the volatility of the price of the underlying instrument and the passage of time. In addition, all trading activities are affected by market liquidity and by local or world political and economical events.

Liquidity risk

An institution faces two types of liquidity risk in its derivatives activities: one related to specific products or markets and the other related to the general funding of the institution's derivatives activities. The former is the risk that an institution may not be able to, or cannot easily, unwind or offset a particular position at or near the previous market price because of inadequate market depth or because of disruptions in the marketplace. Funding liquidity risk is the risk that the institution will be unable to meet its payment obligations on settlement dates or in the event or margin calls. Because neither type of liquidity risk is necessarily unique to derivatives activities, management should evaluate these risks in the broader

context of the institution's overall liquidity. When establishing limits, the institution should be aware of the size, depth and liquidity of the particular market and establish guidelines accordingly.

Operations risk

Operations risk is the risk that deficiencies in information systems or internal control will result in unexpected loss. This risk is associated with human error, system failures and inadequate procedures and controls. This risk can be exacerbated in the case of certain derivatives because of the complex nature of their payment structures and calculation of their values.

Legal risk

Legal risk is the risk that contracts are not legally enforceable or documented correctly. Legal risks should be limited and managed through policies developed by the institution's legal counsel (typically in consultation with officers in the risk-management process) that have been approved by the institution's senior management and board of directors. At a minimum, there should be guidelines and processes in place to ensure the enforceability of counterparty agreements.

CHAPTER V

THE RISK MANAGEMENT PROCESS

Developing an effective derivatives policy should be approached like any other strategic planning activity. The first step is to define the company's objectives by considering the potential uses of derivatives. Any corporate derivatives policy must recognize the fact that there may be a number of different objectives that can be attained by using derivatives. A good corporate derivatives policy should identify each corporate objective and set parameters for derivative that may be used to achieve it. Seldom can one set of guidelines effectively be used to achieve all objectives. In addition to specific guidelines for entering into derivatives transactions, the derivatives policy should provide for a periodic assessment of all the firm's derivatives positions. Depending on the complexity of the transactions, weekly or even daily mark-to-market analysis may be appropriate.

The primary components of a sound risk-management process are the following : a comprehensive risk-measurement approach; a detailed structure of limits, guidelines and other parameters used to govern risk taking; and a strong management information system for controlling, monitoring and reporting risks. These components are fundamental to both derivatives and non-derivatives activities alike. Moreover, the underlying risks associated with these activities, such as credit, market, liquidity, operations and legal risk, are not new to banking, although their measurement and management can be more complex.

Accordingly, the process of risk management for derivatives activities should be integrated into the institution's overall risk-management system to the fullest extent possible using a conceptual framework common to the institution's other activities. Such a common framework enables the institution to manage its risk exposure more effectively, especially since the various individual risks involved in derivatives activities can, at times, be interconnected and can often transcend specific markets.

As is the case with all risk-bearing activities, the risk exposures an institution assumes in its derivatives activities should be fully supported by an adequate capital position. The institution should ensure that its capital position is sufficiently strong to support all derivatives risks on a fully consolidated basis and that adequate capital is maintained in all group entities engaged in these activities.

Risk measurement

One particular problem on managing risk on financial derivatives lie in the difficulties on monitoring. Derivatives, like other financial instruments, are reported in the financial statement on its market value. The reporting mechanism pose no problem for ordinary securities where the maximum exposure is limited to the value of the security. Derivatives, however, are highly leveraged so that daily price movement can exceed the face value of the derivatives by multiples. Some OTC derivative contract do not even show up in financial statement. Such off-balance sheet nature of derivatives make financier hard to monitor the risk exposure at a particular time and hedge against unfavourable price movement.

An institution's system for measuring the various risks of derivatives activities should be

both comprehensive and accurate. Risk should be measured and aggregated across trading and non-trading activities on an institution-wide basis to the fullest extent possible.

While the use of a single prescribed risk-measurement approach for management purposes may not be essential, the institution's procedures should enable management to assess exposures on a consolidated basis. Risk measures and the risk-measurement process should be sufficiently robust to reflect accurately the multiple types of risks facing the institution. Risk-measurement standards should be understood by relevant personnel at all levels of the institution - from individual traders to the board of directors - and should provide a common framework for limiting and monitoring risk-taking activities.

With regard to dealer operations, the process of marketing derivatives positions to market is fundamental to measuring and reporting exposure accurately and on a timely basis. An institution active in dealing foreign exchange, derivatives and other traded instruments should have the ability to monitor credit exposures, trading positions and market movement least daily. Some institutions should also have the capacity, or at least the goal, of monitoring their more actively traded products on a real-time basis.

Analyzing stress situations, including combinations of market events that could affect the banking organization, is also an important aspect of risk measurement. Sound risk-measurement practices include identifying possible events or changes in market behaviour that could have unfavourable effects on the institution and assessing the ability of the institution to withstand them. These analyses should consider not only the likelihood of adverse events, reflecting their probability, but also 'worst case' scenarios. Ideally, such worst case analysis should be conducted on a institution-wide basis by taking into account the effect of default of a large counterparty across both the derivatives and cash trading

portfolios and the loan and funding portfolios.

Such stress tests should not be limited to quantitative exercises that compute potential losses or gains. They should also include more qualitative analyses of the actions management might take under particular scenarios. Contingency plans outlining operating procedures and lines of communication, both formal and informal, are important products of such qualitative analyses.

Limiting risks

A sound system of integrated institution-wide limits and risk-taking guidelines is an essential component of the risk-management process. Such a system should set boundaries for organizational risk-taking and should also ensure that positions that exceed certain predetermined levels received prompt management attention. The limit system should be consistent with the effectiveness of the organization's overall risk-management process and with the adequacy of its capital position. An appropriate limit system should permit management to control exposures, to initiate discussion about opportunities and risks and to monitor actual risk-taking against predetermined tolerances, as determined by the board of directors and senior management.

Global limits should be set for each major type of risk involved in an institution's derivatives activities. These limits should be consistent with the institution's overall risk-measurement approach and should be integrated to the fullest extent possible with institution-wide limits on those risks as they arise in all other activities of the institution. Where appropriate, the limit system should provide the capability to allocate limits down to individual business units.

If limits are exceeded, such occurrences should be made known to senior management and approved only by authorized personnel. These positions should also prompt discussion about the consolidated risk-taking activities of the institution or the unit conducting the derivative activities. The seriousness of limit exceptions depends in large part upon management's approach toward setting limits and on the actual size of individual and organizational limits relative to the institution's capacity to take risk. An institution with relatively conservative limits may encounter more exceptions to those limits than an institution with less restrictive limits.

Reporting

An accurate, informative and timely management information system is essential to the prudent operation of derivatives activities. Accordingly, the quality of the management information system is an important factor in the overall effectiveness of the risk-management process. The risk-management function should monitor and report its measures of risks to appropriate levels of senior management and to the board of directors. In dealer operations, exposures and profit and loss statements should be reported at least daily to managers who supervise but do not, themselves conduct those activities. More frequent reports should be made as market conditions dictate. Reports to other levels of senior management and the board may occur less frequently, but the frequency of reporting should provide these individuals with adequate information to judge the changing nature of the institution's risk profile.

Management information systems should translate the measured risk for derivatives activities

from a technical and quantitative format to one that can be easily read and understood by senior managers and directors using a common conceptual framework for measuring and limiting risks.

Management evaluation and review

Management should ensure that the various components of the institution's risk-management process are regularly reviewed and evaluated. This review should take into account changes in the activities of the institution and in the market environment, since the changes my have created exposures that require additional attention. Any material changes to the risk-management system should also be reviewed.

The risk-management functions should regularly assess the methodologies, models and assumptions used to measure risk and limit exposures. Proper documentation of these elements of the risk-measurement system is essential for conducting meaningful reviews. The review of limit structures should compare limits to actual exposures and should also consider whether existing measures of exposure and limits are appropriate in view of the institution's past performance and current capital position.

The frequency and extent to which an institution should re-evaluate its risk-measurement methodologies and models depends, in part, on the specific risk exposures created by their derivatives activities, on the pace and nature of market changes and on the pace of innovation with respect to measuring and managing risks. At a minimum, an institution with significant derivatives activities should review the underlying methodologies of its models at least annually - and more often as market conditions dictate - to ensure they are appropriate and

consistent, such internal evaluations may, in many cases, be supplemented by reviews by external auditors or other qualified outside parties, such as consultants who have expertise with highly technical models and risk-management techniques. Assumptions should be evaluated on a continual basis.

The institution should also have an effective process to evaluate and review the risks involved in products that are either new to it, or new to the marketplace and of potential interest to the institution. It should also introduce new products in a manner that adequately limits potential losses and permits the testing of internal systems. An institution should not become involved in a product at significant levels until senior management and all relevant personnel (including those in risk-management internal control, legal, accounting and auditing) understand the product and are able to integrate the product into the institution's risk-measurement and control systems.

CHAPTER VI

MANAGEMENT OF PARTICULAR RISK EXPOSURE

Credit risk

Potential credit risk exposure is measured more subjectively than current exposure and is primarily a function of the time remaining to maturity and the expected volatility of the price, rate or index underlying the contract. Dealers and large derivatives participants should assess potential exposure through simulation analysis or other sophisticated techniques, which, when properly designed and implemented can produce estimates of potential exposure that incorporate both portfolio-specific characteristics and current market conditions. smaller end-user may measure this exposure by using 'add-ons' based on more general characteristics. In either case, the assumptions underlying the institution's risk measure should be reasonable and if the institution measure exposure using a portfolio approach, it should do so in a prudent manner.

An institution may use master netting agreements and various credit enhancements, such as collateral or third-party guarantees, to reduce its counterparty credit risk. In such cases, an institution's credit exposures should reflect these risk reducing features only to the extent that the agreements and recourse provisions are legally enforceable in all relevant jurisdictions. This legal enforceability should extend to any insolvency proceeding of the

counterparty. The institution should be able to demonstrate that it has exercised due diligence in evaluation the enforceability of these contracts and that individual transactions have been executed in a manner that provides adequate protection to the institution.

Credit limits that consider both settlement and pre-settlement exposures should be established for all counterparties with whom the institution conducts business. As a matter of general policy, business with a counterparty should not commence until a credit line has been approved. The structure of the credit-approval process may differ among institution, reflecting the organizational and geographic structure of each institution. Nevertheless, in all cases, it is important that credit limits be determined by personnel who are independent of the derivatives function, that these personnel use standards consistent with those used for other activities and that counterparty credit lines are consistent with the organization's policies and consolidated exposures.

If credit limits are exceeded, exceptions should be resolved according to the institution's policies and procedures. In addition, the institution's report should adequately provide traders and credit officers with relevant, accurate and timely information about the credit exposures and approved credit lines.

Similar to bank loans, OTC derivatives products can have credit exposures existing for an extended period. Given these potentially long-term exposures and the complexity associated with some derivatives instruments, an institution should consider the overall financial strength of its counterparties and their ability to perform on their obligations.

Market risk

Market risk is increasingly measured by market participants using a value-at-risk approach, which measures the potential gain or loss in a position, portfolio or institution that is associated with a price movement of a given probability over a specific time horizon. The institution should revalue all trading portfolios and calculate its exposures at least daily. Although an institution may use risk measures other than value at risk, the measure used should be sufficiently accurate and rigorous, and the institution should ensure that it is adequately incorporated into its risk-management process.

Value at risk (VAR) technology - Value at risk (VAR) is a methodology by which institutions can evaluate risk across their portfolios. Beyond measurement, the methodology is giving institutions flexibility to expand portfolio positions and potentially increase profits by better understanding their total risk picture. In essence, VAR is the assessment of how much an institution stand to lose at any point in time based upon estimated volatility and correlation. As a result of this assessment, institutions may determine the amount of capital to set aside to offset trading risks.

VAR involves three steps:

First, determine past changes in the underlying rate and prices - this gives the standard deviation in daily market movements;

second, establish a worst-case scenario; finally, calculate the potential loss by inserting the worst case into the portfolio valuation and projecting it over the 'unwinding period' (i.e. the span over which a loss can occur).

A full analysis would also take into account movements in abnormal markets. This is probably best achieved by using stress test models (techniques for determining how products perform in abnormal market conditions), which are becoming standard practice.

An institution should compare its estimated market risk exposures with actual behaviour. In particular, the output of any market risk models that require simulations or forecasts of future prices should be compared with actual results. If the projected and actual results differ materially, the assumptions used to derive the projections should be carefully reviewed or the models should be modified, as appropriate.

The institution should establish limits for market risk that relate to its risk measures and that are consistent with maximum exposures authorized by its senior management and board of directors. These limits should be allocated to business units and individual decision-makers and be clearly understood by all relevant parties. Exceptions to limits should be detected and adequately addressed by management. In practice, some limit systems may include additional elements such as stop-loss limits and guidelines that may play an important role in controlling risks.

An institution whose derivatives activities are limited in volume and confined to end-user activities may need ,less sophisticate risk-measurement systems than those required by a dealer. Senior management at such an institution should ensure that all significant risk arising from its derivatives transactions can be quantified, monitored and controlled. At a minimum, risk-management systems should evaluate the possible impact on the institution's earnings and capital which may result from adverse changes in interest rates and other market conditions that are relevant to risk exposure and the effectiveness of derivatives transactions in the institution's overall risk management.

Liquidity risk

In developing guidelines for controlling liquidity risks, an institution should consider the possibility that it could lose access to one or more markets, either because of concerns about the institution's own creditworthiness, the creditworthiness of a major counterparty or because of generally stressful market conditions. At such times, the institution may have less flexibility in managing its market, credit and liquidity risk exposures. An institution that makes markets in over-the-counter derivatives or that dynamically hedges (dynamic hedging refers generally to the continuous process of buying or selling instrument to offset open exposures as market conditions change (e.g. an option writer selling an underlying asset as its price falls)) its positions requires constant access to financial markets and that need may increase in times of market stress. The institution's liquidity plan should reflect the institution's ability to turn to alternative markets. such as futures or cash markets, or to provide sufficient collateral or other credit enhancements in order to continue trading under a broad range of scenarios.

An institution that participates in over-the-counter derivatives markets should assess the potential liquidity risks associated with the early termination of derivatives contracts. Many forms of standardized contracts for derivatives transaction allow counterparties to request collateral or to terminate their contracts early if the institution experiences an adverse credit event or a deterioration in its financial condition. In addition, under conditions of market stress, customers may ask for the early termination of some contracts within the context of the dealer's market-making activities. In such situation, an institution that owes money on derivatives transactions may be require to deliver collateral or settle a contract early and

possibly at a time when the institution may face other funding and liquidity pressures. Early termination may also open up additional, unintended, market positions. management and directors should be aware of these potential liquidity risks and should address them in the institution's liquidity management process.

Operations risk

Institution should manage its operational risk by proper internal control. Internal control can be though of as a process by which a company's management and employees keep the risks of the business without accepting bounds. The foundation of internal control is build with management's own vision of the importance of controls. It is the process and structure used by management, under the guidance and oversight of a board of directors, to manage the risk inherent in the company's business. Once a firm understands its risk appetite, it can build an effective control structure. The control structure can be though of in terms of a pyramid, with its activities.

The board of directors and senior management should ensure the proper dedication of resources (financial and personnel) to support operations and system development and maintenance. The operations unit for derivatives activities, consistent with other trading and investment activities, should report to an independent unit and should be managed independently of the business unit. The sophistication of the systems support and operational capacity should be commensurate with the size and complexity of the derivatives business activity.

Systems support and operational capacity should be adequate to accommodate the types of

derivatives activities in which the institution engages. This includes the ability to efficiently process and settle the volumes transacted through the business unit., to provide support for the complexity of the transactions booked and to provide accurate and timely input. Support systems and the systems developed to interface with the official databases should generate accurate information sufficient to tallow business unit management and senior management to monitor risk exposures in a timely manner.

Systems needs for derivatives activities should be evaluated during the strategic planning process. Current and projected volumes should be considered together with the nature of the derivatives activity and the user's expectations. Consistent with other systems plans, a written contingency plan for derivatives products should be in place.

With the complexity of derivatives products and the size and rapidity of transactions, it is essential that operational units be able to capture all relevant details of transactions, identify errors and process payments or move assets quickly and accurately. This requires a staff of sufficient size, knowledge and experience to support the volume and type of transactions generated by the business unit. Management should develop appropriate hiring practices and compensation plans to recruit and retain high caliber staff.

Systems design and needs may vary according to the size and complexity of the derivatives business. However each system should provide for accurate and timely processing and allow for proper risk exposure monitoring. Operational systems should be tailored to each institution's needs. Limited end-users of derivatives may not require the same degree of automation needed by more active trading institutions. All operational system and units should adequately provide for basic processing, settlement and control of derivatives transactions.

The more sophisticated institution's activity, the more need there is to establish automated systems to accommodate the complexity and volume of the deals transacted, to report position data accurately and to facilitate efficient reconciliation.

Segregation of operational duties, exposure reporting and risk monitoring from the business unit is critical to proper internal control. Proper internal control should be provided over the entry of transactions into the database, transaction numbering, date and time notation and the conformation and settlement process. Operational controls should also be in place to resolve disputes over contract specifications. In this regard, an institution must ensure that trades are confirmed as quickly as possible. The institution should monitor the consistently between the terms of a transaction as they were agreed upon and the terms as they were subsequently confirmed.

The operations department, or another unit or entity independent of the business unit, should be responsible for ensuring proper reconciliation of front and back office databases on a regular basis. This includes the verification of position data, profit and loss figures and transaction-by-transaction details.

The institution should ensure that the methods it uses to values its derivatives positions are appropriate and that the assumptions underlying those methods are reasonable. The pricing procedures and models the institution chooses should be consistently applied and well documented. Models and supporting statistical analyses should be validated prior to use and as market conditions warrant.

Management of the institution should ensure that a mechanism exists whereby derivatives

contract documentation is confirmed, maintained and safeguarded. An institution should establish a process through which documentation exceptions are monitored and resolved and appropriately reviewed by senior management and legal counsel. The institution should also have approved policies that specify documentation requirements for derivatives activities and formal procedures for saving and safeguarding important documents that are consistent with legal requirements and internal policies.

Although operations risks are difficult to quantify, they can often be evaluated by examining a series of 'worst-case' or 'what-if' scenarios, such as a power loss, a doubling of transaction volume or a mistake found in the pricing software for collateral management. They can also be assessed through periodic reviews of procedures, documentation requirements, data processing systems, contingency plans and other operational practices. Such reviews may help to reduce the likelihood of error and breakdowns in controls, improve the control of risk and the effectiveness of the limit system and prevent unsound marketing practices and the premature adoption of new products or lines of business. Considering the heavy reliance of derivatives activities on computerized systems, an institution must have plans that take into account potential problems with its normal processing procedures.

Legal risk

Prior to engaging in derivatives transactions, an institution should reasonably satisfy itself that its counterparties have the legal and necessary regulatory authority to engage in those transactions. In additional to determining the authority of a counterparty to enter into a derivatives transaction, an institution should also reasonably satisfy itself that the terms of any contract governing its derivatives activities with a counterparty are legally sound.

An institution should adequately evaluate the enforceability of its agreements before individual transactions are consummated. Participants in the derivatives markets have experienced significant losses because they were unable to recover losses from defaulting counterparty when a court held the counterparty had acted outside of its authority in entering into such transactions. An institution should ensure that its counterparties have the power and authority to enter into derivatives transactions and that the counterparties' obligations arising form them are enforceable. Similarly, an institution should also ensure that its rights with respect to any margin or collateral received from a counterparty are enforceable and exercisable.

The advantages of netting arrangements can include a reduction in credit and liquidity risks, the potential to do more business with existing counterparties within existing credit lines and a reduced need for collateral to support counterparty obligations. The institution should ascertain that its netting agreements are adequately documented and that they have been executed properly. Only when a netting arrangement is legally enforceable in all relevant jurisdictions should an institution monitor its credit and liquidity risks on a net basis.

CHAPTER VII

MANAGEMENT'S ROLE IN RISK CONTROL

Firms engaged in significant OTC derivatives activities should have in place comprehensive internal risk-management control systems that are commensurate with the scope, size and complexity of the activities that have been authorized and the nature and extent of the risks they entail. The following overview summarizes the key elements of such risk-management control systems.

Role of the governing body or other authorizing body

Authorizing body

The OTC derivatives activities of a firm should be conducted pursuant to general authorizing guidelines (Guidelines) reviewed and approved the by firm's governing body (i.e. a board of directors or its equivalent), a committee of such governing body or committee designated by the governing body for the purpose of approving such guidelines (Authorizing Body). The Authorizing Body should be selected by the governing body based on, among other relevant considerations, the composition and expertise of the governing body, the customary allocation of equivalent responsibilities within senior management of the firm and the nature,

scope and complexity of the firm's OTC derivatives activities.

If the Authorizing Body is not the governing body (or a committee comprised exclusively of members of the governing body) of the firm the Guidelines, and material amendments to the Guidelines, should be reported to the firm's governing body (or a committee comprised exclusively of members of the governing body).

Written guidelines

The Guidelines should be adopted in written form by the firm's Authorizing Body.

Relevant considerations

Relevant factors to be considered by the Authorizing Body in approving Guidelines include the firm's overall business strategies and product lines, its tolerance for risk and its general risk-management philosophy, its past performance and experience, its financial condition and capital levels, its internal expertise and experience, the sophistication of its risk-monitoring and risk-management systems and processes and any regulatory or organizational, constraints.

Authorizing Guidelines

The Guidelines should address the following areas:

1. the scope, or the procedures for determining the scope, of authorized activity or any non-quantitative limitation on the scope of authorized activities;
2. the quantitative guidelines for management the firm's overall or constituent risk exposure;
3. the significant structural elements of the firm's risk-monitoring and risk-management systems and processes;
4. the scope and frequency of reporting by management on risk exposures; and
5. the mechanisms for reviewing the Guidelines.

Scope of authorized activity

If the Authorizing Body wishes to impose specific (non-quantitative) constraints on the scope of permitted activities (such as product, market, geographic or trading strategy restrictions), the Guidelines should specify any restrictions. If the Authorizing Body wishes to approve only specific activities, the Guidelines should specify the scope of authorized activity. The Guidelines may designate one or more individuals within management or management committees to perform the function authorizing or restricting activities in particular products or markets.

Guidelines on risk exposure

The Guidelines should establish market and credit risk exposure guidelines applicable to the overall or constituent risk exposures of the firm's derivatives activities risk exposure guidelines should be based on factors such as the character of the risk being measured, the extent and nature of the derivative products utilized, the risk-measurement methodology

employed by the firm and the nature of the firm's counterparties and their industry, country or credit rating categories.

If the Guidelines do not contain specific limits on risk exposures, they should contain quantitative guidelines sufficient to enable management to implement specific quantitative limits. The Guidelines may provide that specified individuals or committees within management, independent from or senior to the relevant business or trading unit, may approve exceptions to the quantitative guidelines in the Guidelines, with material exceptions to be periodically reported to the Authorizing Body.

The Guidelines should also address the degree to which the firm's OTC derivatives-related risk exposures should be aggregated, for purposes of risk monitoring and risk management, with the related risk exposures arising from other trading activities of the firm.

Risk-monitoring and risk-management structures The Guidelines should address the following structure elements of risk monitoring and risk management:

1. *An independent process and check and balances for risk monitoring* The Authorizing Guideline should define a process for risk monitoring independent from the business or trading unit whose activities create the risks being monitored.

   In connection with risk-monitoring systems, the Authorizing Body should also consider the need for organizational checks and balances to protect against irregularities or inconsistencies in risk measurement and to ensure to the greatest extend practicable that the risks posed by OTC derivative products are uniformly and accurately identified and evaluated.

2. The appropriate degree of independence for risk management The Guidelines should define a risk-management function to be performed by specified committees or individuals independents from or senior to the relevant business or trading units whose activities create risks for the firm.

3. Authority, resources and information reporting. The Authorizing Body should determine that the bodies or personnel performing risk-monitoring and risk-management functions have the necessary authority and resources to accomplish their management control objectives. The Authorizing Body should also determine that mechanism are in place through which information regarding the firm's risk-creating activities will be reported to risk-monitoring and risk-management personnel.

4. Ongoing review of systems and processes. The Authorizing Body should review from time to time the firm's risk-monitoring and risk-management systems and processes.

5. Scope and frequency of reporting. The Guidelines should identify the type, scope and frequency of reports to be prepared in connection with the firm's risk-monitoring and risk-management systems and processes and to be made available for review by the governing body, the Authorizing Body and senior management. Such reports should contain information regarding the firm's position and risk exposures to facilitate effective oversight of the risk-monitoring and risk-management functions. The Authorizing Body should review the scope and frequency of reporting as business and market circumstances change.

Role of management

Firm management should ensure that control procedures with respect to the firm's OTC derivatives activities are consistent with the firm's Guidelines, including, in particular, procedures with respect to the following matters:

Measurement of risk consistent with prescribed guidelines

Systems and procedures should be in place to identify and assess the material risks arising from the firm's derivatives activities and to assist in managing those risks.

Risk identification and measurement procedures should address the following risk factors:

1. Market risk - Mechanism should be in place to measure market risk consistent with established risk-measurement guidelines. These procedure should include the capability to measure basic components of market risk on a business unit level as well as on a firm-wide level and to provide the information necessary to conduct 'stress testing'.

2. Credit risk - Procedures should be in place to measure the risk that a counterparty will be unable to meet its obligations to the firm and to measure credit exposures and concentrations against established guidelines. Credit risk-measurement system should assess both the firm's current credit exposure to a counterparty and its potential exposure. Management should consider the use of risk-reducing practices such as bilateral and multilateral netting arrangements, collateral agreements, third-party credit enhancement and offsetting exposures to the same counterparty.

3. Liquidity risk - Procedures should be in place to measure and provide for potential funding requirements that might arise as a result of the impact of market movements on cash flows and collateral and margin requirements in light of mismatches in the timing of offsetting payment and delivery obligations, taking into account the potential impact of contractual provisions, such as early termination provisions, that may give rise to such timing mismatches.

Establishment of risk guideline for business units

Market risk exposure guidelines should be in place for each of the firm's business units

Data collection and synthesis

Processes should be in place through which the data necessary to conduct risk-monitoring and risk-management functions effectively is made readily accessible on a timely basis and information management systems are available to capture, monitor, analyze and report relevant data.

Policies for valuation methodology

Systems and procedures should be in place to mark to market the value of derivative products or portfolios accurately and on a timely basis, as necessary to implement the risk-monitoring and risk-management functions required under the Guidelines.

The firm's valuation systems should identify and utilize definitions of value in view of the particular OTC derivative products or markets involved and the purposes for which the valuation is used, and techniques should be identified to address situations where no market prices are readily observable (especially for OTC derivatives). Valuation data collected with respect to an instrument or portfolio should be documented, should specify any pricing or related assumptions and should be maintained for review by the firm's auditors or other authorized examiners.

Frequency of mark to market

The frequency with which derivatives positions or portfolios are required to be marked to market should be consistent with the risk-management guidelines established by the Authorizing Body and should be based on the volatility of the relevant market factor(s) and the nature of the firm's risk profile.

Valuation policy

A valuation policy should be in place that reflects fair market value and, where appropriate, incorporates adjustments for credit quality, market liquidity, funding costs and transaction administration costs.

Pricing verification procedures

Routine procedures should be in place, where practicable, for verifying the prices assigned to particular derivative products. In addition, procedures and parameters should be in place for validation g valuation methodologies on a periodic basis. Any assumptions (such as historic correlation and volatility(used in such valuations should be periodically evaluated.

Model verification procedures

Statistical or other simulation models for conducting 'stress tests' and measuring the impact or various market movements on the value of derivative products or portfolios should themselves be subject to review and validation. Among other objectives, such review and validation should compare model predictions against actual market performances and should provide for timely identification and correction of any deficiencies in the models.

Establish a process for identifying and managing deviations from risk guidelines

A method should be in place for identifying and reviewing situation in which internal risk-management guidelines have been exceeded and for taking any responsive or remedial action that may be necessary.

Other controls

Other management control functions include the following:

1. Legal risk

Procedures should be in place to monitor and address the risk that an OTC derivative transaction will be unenforceable because (i) the underlying transaction documentation is inadequate; (ii) the counterparty lacks the requisite authority or is subject to legal transaction restrictions; (iii) the underlying transaction is impermissible under applicable law; or (iv) applicable bankruptcy or insolvency laws limit or alter contractual remedies.

2. Operational risk

Procedures should be in place to adequately identify and address any deficiencies in the firm's operating systems (e.g. database management, trade entry, trade processing, trade confirmation, payment, delivery, receipt, collateral management, valuation and related information systems) and to contain the extent of losses arising from unidentified deficiencies. Operation risk measurement and management procedures should, as appropriate, also incorporate the use of disaster recovery planing or related techniques for reducing the firm's exposure to operational risks.

3. Designate authority to commit on trades

Procedures should be in place to authorize certain employees to commit the firm to particular types of derivatives transactions, to specify any quantitative limits on such authority and to provide for the oversight of their exercise of such authority. Authorized employees should understand the risk exposures arising from the product in question, the applicable risk-management guidelines and the management control procedures for documenting recording and reporting the transaction.

4. Role of external audit functions

External auditors should periodically review the integrity of risk-monitoring and risk-management functions.

5. Approve internal controls for documentation, adequacy of operational procedures and risk-reduction procedures

Procedures should be in place to provide for adequate documentation of the principal terms of OTC derivatives transactions and other relevant information regarding such transactions. Such documentation should be appropriately maintained and should be made available to the firm's auditors or other authorized examiners. Internal operational systems should also provide for effective tracking and process of OTC derivatives transactions from their initiation to their settlement

6. Provide for an adequate level of professional expertise for risk monitoring and risk management

Adequate personnel resources with appropriate expertise should be committed to implementing effectively the firm's risk-monitoring and risk-management systems and processes.

CHAPTER VIII

CONCLUSION

While financial derivatives have been around for a very long time, the past decade and a half has seen the variety and complexity of the available derivatives increase markedly. When used strategically, derivatives can be very effective tools to mitigating risks whereas when used to speculate, they can be trouble, especially if one is unaware that he or she is betting.

Risk management is a dynamic process that requires a company to monitor the policies and procedures governing the company's direction. An effective risk management process should ensure that :

- risk-management duties are properly supervised;
- any segregation of management duties is clearly identified;
- position and risk are coherently reported
- transactions are properly documented
- the roles of the players are adequately defined

Companies need to decide and make clear whether responsibility for certain functions is to be centralized or decentralized. A useful rule is that responsibilities for different functions should be spread.

- The treasury should handle the risk-management strategy.
- Accounting should deal with record keeping, processing and settlement.
- The legal department should arrange contractual relationships.
- The credit control department should deal with the assessment of counterparties.

This is by no means an exhaustive list but it indicates the kind of considerations which should underscore management thinking when deciding on division of responsibilities. It should also help to promote effective teamwork on the issues.

Management should establish a policy for general risk management and specifically for derivatives usage. It may want to form a risk-management committee to draw up the strategy and monitor its implementation. Any such strategy should be reasonably detailed and specific. Too many generalities can lead to confusion, ambiguity and misinterpretation. A policy to hedge may be stated but without describing what constitutes a hedge may be stated but without describing what constitutes a hedge or identifying which products may be used.

The treasury should set clearly the nature of the policy it intends to pursue and which products it will use. Communication throughout the organization is essential so that everyone who needs to know is aware of the strategy.

This strategy should be approved by the executive and board of directors. Meetings should be established to review the strategy with senior management.

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